

Docket No. 1670.1015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Yun Soo CHOE et al.

Serial No. 10/652,493

Group Art Unit: 3742

Confirmation No. 2730

Filed: September 2, 2003

Examiner: Sang Yeop Paik

For: HEATING CRUCIBLE FOR ORGANIC THIN FILM FORMING APPARATUS

APPEAL BRIEF

Mail Stop Appeal Brief—Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the Notice of Appeal of January 12, 2007, this Appeal Brief is being filed in response to the Final Office Action of October 12, 2006, the Advisory Action of January 4, 2007, and the Notice of Panel Decision from Pre-Appeal Brief Review of March 19, 2007, which reset the period for filing an Appeal Brief to expire on April 19, 2007. The fee of \$500.00 required for filing this Appeal Brief is being submitted herewith.

Also being submitted herewith is a Submission of English Translation of Priority Document submitting an English translation of Korean Patent Application No. 2002-52898 filed on September 3, 2002, the Korean priority application of the present application, and a Certification of Translation containing a statement that the English translation is accurate to perfect the applicants' claim for foreign priority under 35 USC 119(a)-(d). A certified copy of the Korean priority application was filed on September 2, 2003.

An Information Disclosure Statement was filed on January 25, 2007, and it is respectfully requested that the Information Disclosure Statement be considered.

TABLE OF CONTENTS

I.	Real Party in Interest	4
II.	Related Appeals and Interferences	4
III.	Status of Claims.....	4
IV.	Status of Amendments.....	4
V.	Summary of Claimed Subject Matter.....	7
VI.	Grounds of Rejection to Be Reviewed on Appeal.....	9
VII.	Argument	10
	Rejection 1—Claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31.....	10
	Claims 1 and 23—"heat-resistant layer" features.....	10
	Claims 1 and 24—"reflective layer" features.....	15
	Chandler	15
	Isaacson	18
	Claims 2 and 18	20
	Claims 7 and 25	22
	Claim 9.....	24
	Claim 16.....	27
	Claims 29 and 30	28
	Claim 31	30
	Claims 4, 11-13, 17, 21, and 22.....	31
	Conclusion—Rejection 1	31
	Rejection 2—Claims 3, 14, and 19.....	31
	Rejection 3—Claims 8, 15, and 26.....	32
	Rejection 4—Claim 10	32

Rejection 5—Claim 20	35
Rejection 6—Claims 27 and 28.....	36
Claim 27	36
Claim 28	39
Conclusion—Rejection 6	40
Conclusion—Argument	40
VIII. Claims Appendix.....	42
IX. Evidence Appendix	47
X. Related Proceedings Appendix (none).....	48

I. REAL PARTY IN INTEREST

The real party in interest is the current assignee of the present application, Samsung SDI Co., Ltd., a corporation of the Republic of Korea, having a place of business at 575 Shin-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea.

II. RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences, or judicial proceedings known to the applicants, the applicants' legal representatives, or the assignee which may be related to, directly affect, or be directed affected by or have a bearing on the Board's decision in the pending appeal in the present application.

III. STATUS OF CLAIMS

Claims 1-4 and 7-31 are pending, with claim 1 being independent.

Claims 5 and 6 have been canceled.

Claims 1-4 and 7-31 stand rejected.

Claims 1-4 and 7-31 are on appeal.

IV. STATUS OF AMENDMENTS

An Amendment After Final Rejection was filed on February 7, 2006, in response to the Final Office Action of November 17, 2005.

In the Advisory Action of March 1, 2006, the Examiner indicated that, for purposes of appeal, the Amendment After Final Rejection of February 7, 2006, would be entered.

A Request for Continued Examination (RCE) and an Amendment were filed on March 16, 2006, in response to the Advisory Action of March 1, 2006. On page 1 of the Amendment of March 16, 2006, the applicants requested that the Amendment After Final Rejection of February 7, 2006, not be entered. The Amendment of March 16, 2006, amended the application as it appeared prior to the Amendment After Final Rejection of February 7, 2006.

On page 7 of the Amendment of July 27, 2006, and page 6 of the Request for Reconsideration After Final Rejection of December 11, 2006, the applicants pointed out that the image file wrapper of the application indicates that the Amendment After Final Rejection of February 7, 2006, is to be entered, and requested that the Examiner have the image file wrapper of the application corrected to indicate that the Amendment After Final Rejection of February 7, 2006, is not to be entered. In response to these requests, the Examiner stated as follows in the Advisory Action of January 4, 2007:

It is also noted that the amendment after final mailed on 2/7/06 is properly considered and entered by the examiner. No request was made at that time by the applicant whether to enter or not enter the paper mailed on 2/7/06. However, it is noted that after the prosecution is closed, it is the examiner's discretion whether to enter [sic] the response [sic] or not, and once it is entered, it would not be made un-entered.

However, the Advisory Action of March 1, 2006, indicated that the Amendment After Final Rejection of February 7, 2006, would be entered for purposes of appeal, and the applicants did not pursue an appeal at that time, but filed the Request for Continued Examination (RCE) and the Amendment of March 16, 2006, in which they requested that the Amendment After Final Rejection of February 7, 2006, not be entered. Furthermore, MPEP 706.07(h)(III)(D) provides that "[i]f conflicting amendments have been previously filed, applicant should clarify which amendments should be entered upon filing the RCE."

Nevertheless, it appears that this issue is essentially moot for the following reasons. The Amendment After Final Rejection of February 7, 2006, presented amendments to the drawings and arguments. The Amendment of March 16, 2006, repeated the amendments to the drawings and the arguments that were presented in the Amendment After Final Rejection of February 7, 2006, and also presented amendments to the specification and the claims and additional arguments. Accordingly, it is submitted that the current state of the application would be the same regardless of whether the Amendment After Final Rejection of February 7, 2006, has been entered.

A Request for Reconsideration After Final Rejection that did not present any amendments but presented only arguments was filed on December 11, 2006, in response to the Final Office Action of October 12, 2006.

In the Advisory Action of January 4, 2007, the Examiner stated that "[t]he reply filed 11 December 2006 fails to place this application in condition for allowance," and that "[t]he request for reconsideration has been considered but does NOT place the application in condition for allowance because: the applicant's arguments are not deemed persuasive."

V. SUMMARY OF CLAIMED SUBJECT MATTER

Title 37 CFR 41.37(c)(1)(v) requires this Appeal Brief to contain a concise explanation of the subject matter defined in each of the independent claims involved in this appeal, which shall refer to the specification by page and line number, and to the drawing, if any, by reference characters. Such a concise explanation is provided below for the subject matter defined in independent claim 1 (the only independent claim), except that the concise explanation refers to the specification by paragraph number, rather than page and line number. However, this concise explanation is not to be construed as limiting the scope of claim 1 in any way.

Title 37 CFR 41.37(c)(1)(v) also requires, for each independent claim involved in this appeal and for each dependent claim argued separately under the provisions of 37 CFR 41.37(c)(1)(vii), that every means plus function and step plus function as permitted by 35 USC 112, sixth paragraph, be identified and that the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters. However, this Appeal Brief does not contain such an explanation because it is the applicants' position that no means plus function or step plus function elements are recited in the claims of the present application.

The specification includes the following amended and new paragraphs that have been presented during the prosecution of the present application and appear at the locations indicated below:

[0030] (amended) appears on page 2 of the Amendment of September 7, 2005

[0031] (amended) appears on page 2 of the Amendment of March 16, 2006

[0035] (amended) appears on page 3 of the Amendment of September 7, 2005

[0035.1] (new) appears on page 2 of the Amendment of March 16, 2006

[0035.2] (new) appears on pages 2 and 3 of the Amendment of March 16, 2006

[0038] (amended) appears on page 3 of the Amendment of March 16, 2006

[0039] (amended) appears on page 3 of the Amendment of September 7, 2005

[0040] (amended) appears on page 3 of the Amendment of September 7, 2005

The following concise explanation refers to the four replacement sheets of drawings containing FIGS. 1-3, 4A, 4B, and 5 submitted with the Amendment of March 16, 2006, in response to the Examiner's requirement for corrected drawings in the Final Office Action of November 17, 2005. However, the Office Action of May 2, 2006, did not indicate whether these replacement sheets of drawings have been accepted. The applicants requested that the Examiner indicate whether these replacement sheets of drawings have been accepted on page 7 of the Amendment of July 27, 2006, and on page 7 of the Request for Reconsideration After Final Rejection of December 11, 2006, but the Examiner did not respond to these requests in the Final Office Action of October 12, 2006, and the Advisory Action of January 4, 2007.

These replacement sheets of drawings were also discussed during the personal interview conducted on December 28, 2006. In the Interview Summary for the personal interview, the Examiner states that "[t]he drawings submitted on 3/16/06 are acceptable and would be indicated as such in the next office action." However, as indicated above, the Examiner did not indicate this in the Advisory Action of January 4, 2007.

According to an aspect of the invention as recited in independent claim 1, a heating crucible 50 (paragraph [0027] and FIGS. 3 and 5) for an organic thin film forming apparatus (paragraph [0027] and FIG. 3) includes a main body 51 (paragraph [0038] and FIG. 5) in which to contain an organic substance 57 [paragraph [0038] and FIG. 5]; a cover 40 (paragraph [0030] and FIGS. 3, 4A-4C, and 5) provided on the main body 51, the cover 40 formed of an insulating material (paragraphs [0030] and [0033]) and having a nozzle 42 (paragraphs [0030], [0035.1], and [0035.2] and FIGS. 4A-4C and 5) through which a gaseous organic substance (paragraph [0030] and the dashed lines in FIG. 3) comes out from the main body 51; a cover heater 43 (paragraphs [0030]-[0033] and FIGS. 4A-4C and 5) formed as a thin film type on the top surface of the cover 40; a heat-resistant layer 46 (paragraphs [0030] and [0035] and FIGS. 4A, 4B, and 5) formed on a surface of the cover heater 43; a reflective layer 47 (paragraphs [0030] and [0035] and FIGS. 4A, 4B, and 5) between the cover heater 43 and the heat-resistant layer 46; and a body heater 53 (paragraph [0038] and FIG. 5) heating the main body 51.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 are unpatentable under 35 USC 103(a) over Chow (U.S. Patent No. 5,157,240) in view of Chandler (U.S. Patent No. 2,799,764) or Isaacson et al. (Isaacson) (U.S. Patent No. 3,842,241).

2. Whether claims 3, 14, and 19 are unpatentable under 35 USC 103(a) over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Kano et al. (Kano) (U.S. Patent No. 6,242,719).

3. Whether claims 8, 15, and 26 are unpatentable under 35 USC 103(a) over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Bichrt (U.S. Patent No. 6,162,300).

4. Whether claim 10 is unpatentable under 35 USC 103(a) over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Okuda et al. (Okuda) (U.S. Patent No. 4,804,823).

5. Whether claim 20 is unpatentable under 35 USC 103(a) over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Takagi (U.S. Patent No. 4,217,855).

6. Whether claims 27 and 28 are unpatentable under 35 USC 103(a) over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Chen et al. (Chen) (U.S. Patent No. 6,024,799) or Murakami et al. (Murakami) (U.S. Patent No. 5,728,223).

VII. ARGUMENT

Rejection 1—Claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31

Claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 stand rejected under 35 USC 103(a) as being unpatentable over Chow (U.S. Patent No. 5,157,240) in view of Chandler (U.S. Patent No. 2,799,764) or Isaacson et al. (Isaacson) (U.S. Patent No. 3,842,241).

However, it is submitted that claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 are patentable over Chow, Chandler, and Isaacson for at least the following reasons.

Pursuant to MPEP 2143.03, to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). However, for the reasons discussed below, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest various features of claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, such that the Examiner has not established a *prima facie* case of obviousness with respect to these claims.

As a preliminary matter, it is noted that, except for claim 9, the Examiner did not specifically refer to any of claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 in the main explanation of the rejection on pages 2 and 3 of the Final Office Action of October 12, 2006. The Examiner merely provided a narrative in which he stated that Chow, Chandler, and Isaacson allegedly disclose or suggest various features without identifying the claims to which his comments pertain. Accordingly, should the Examiner repeat the rejection in an Examiner's Answer or a new Office Action, it is respectfully requested that the Examiner provide a more detailed explanation of the rejection specifically identifying the claims to which his comments pertain.

Claims 1 and 23—"heat-resistant layer" features

It is submitted that Chow, Chandler, and Isaacson do not disclose "a heat-resistant layer formed on a surface of the cover heater" as recited in independent claim 1, or "a heat-resistant layer on the surface of the body heater" as recited in dependent claim 23.

The Examiner considers protective layer 25' of cover 11 in Figs. 2 and 4 of Chow to be "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1. Chow's protective layer 25' is described as follows in column 5, lines 46-48, of Chow:

Again, a pyrolytic boron nitride outer protective layer, 25', covers the structure shown therebelow in FIGS. 2 and 4.

The purpose of Chow's protective layer 25' is described as follows in column 6, lines 29-35, of Chow:

Also, the covering of heating elements 22' and 24' by protective layer 25' keeps them from being exposed directly to the substrate on which thin films are being deposited. This avoids the incorporation into the films being deposited of contaminants arising from the heating of these heating elements.

However, it is submitted that nothing whatsoever in the above passages of Chow or in any other portion of Chow indicates that Chow's protective layer 25' is "a heat-resistant layer" as recited in claim 1 as alleged by the Examiner.

Furthermore, the Examiner considers protective layer 25 that covers the body heater as shown in Figs. 1-3 and 7 of Chow to be "a heat-resistant layer on the surface of the body heater" as recited in claim 23. Chow's protective layer 25 and its purposes are described as follows in column 4, line 60, through column 5, line 3, of Chow:

All of this structure on the outer side of shell 20 is then finally covered by a protective layer, 25, of pyrolytic boron nitride, again deposited using a well known chemical vapor deposition process to a thickness of 1.0 to a few mils. Protective layer 25 prevents outer conductor 24 therebeneath from adsorbing gaseous impurities when out in the open which could later outgas at the crucible operating temperatures. Further, the pyrolytic graphite in outer heater 24, in the absence of protective layer 25, may react with residual molecules occurring thereabout even after a hard vacuum has been pulled therein.

However, it is submitted that nothing whatsoever in the above passage of Chow or in any other portion of Chow indicates that Chow's protective layer 25 is "a heat-resistant layer" as recited in claim 23 as alleged by the Examiner.

Nevertheless, as can be seen from the Examiner's comments in the paragraph bridging pages 5 and 6 of the Office Action of May 2, 2006, the Examiner considers Chow's protective

layers 25' and 25 to be a "heat-resistant layer" as recited in claims 1 and 23 because paragraph [0035] of the applicants' specification as originally filed states that "the heat-resistant layer 46, which is formed on the cover heater 43, is formed as a thin film type on the cover body 41," and column 4, line 60, through column 5, line 3, of Chow states that Chow's protective layer 25 has "a thickness of 1.0 to a few mils" which the Examiner considers to be "a thin material." The Examiner's rationale appears to be that since the applicants disclose that the heat-resistant layer 46 is formed as a thin film type, and since Chow discloses that Chow's protective layer 25 is a thin material, then Chow's protective layers 25' and 25 are a "heat-resistant layer" as recited in claims 1 and 23.

The Examiner has apparently concluded that the statement that "the heat-resistant layer 46 . . . is formed as a thin film type" in paragraph [0035] of the applicants' specification as originally filed means that any layer that is formed as a thin film type, i.e., as a thin layer, is inherently a "heat-resistant layer" as recited in claims 1 and 23. However, if the Examiner's position were correct, then a thin layer of any material, such as frozen hydrogen, water, liquid sodium, or aluminum, would also inherently be a "heat-resistant layer" merely by reason of being thin, regardless of whether the thin layer in question actually has a heat-resistant property.

Pursuant to MPEP 2111, during patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). However, the broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999).

Here, it is submitted that the Examiner's interpretation is unreasonable because it effectively ignores the limitation "heat-resistant" in the term "heat-resistant layer" recited in claims 1 and 23. In effect, the Examiner has interpreted claims 1 and 23 as if they recited a "thin layer," rather than a "heat-resistant layer." It is submitted that this interpretation is also inconsistent with the interpretation that those skilled in the art would reach.

Furthermore, it is submitted that in order for Chow's protective layer 25' to be considered "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1, and for

Chow's protective layer 25 to be considered to be "a heat-resistant layer on the surface of the body heater" as recited in claim 23, the Examiner is required to show that Chow's protective layers 25' and 25 are in fact a "heat-resistant layer" as recited in claims 1 and 23. However, it is submitted that the Examiner has not made an explicit showing that this is the case, but has apparently relied on a theory of inherency.

Pursuant to MPEP 2112(IV), the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

Here, the teaching of Chow relied on by the Examiner is that Chow's protective layers 25' and 25 have "a thickness of 1.0 to a few mils" as described in column 5, lines 63-64, of Chow. However, it is submitted that the Examiner has not provided a basis in fact and/or technical reasoning to reasonably support his apparent determination that it necessarily flows from this teaching that Chow's protective layers 25' and 25 are a "heat-resistant layer" as recited in claims 1 and 23.

Furthermore, it is submitted that the term "heat resistant layer" in claims 1 and 23 refers to a layer that blocks transmission of heat. It is submitted that this would have been understood by one of ordinary skill in the art at the time the invention was made from the following passage in paragraph [0035], lines 2-5, of the specification of the present application:

The heat-resistant layer 46 blocks heat generated by the cover heater 43 from being transferred to an external space above the heating crucible 50, i.e., the internal space of the vacuum chamber

31, so that all of the heat generated by the cover heater 43 is transmitted inside the heating crucible 50.

and from the following passage in paragraph [0039], lines 1-3, of the specification of the present application:

A heat-resistant layer 56 may be formed to surround the body heater 53, formed on the main body 51, so as to prevent heat from being emitted outside the main body 51 and raising the temperature of the vacuum chamber.

In fact, the terms "adiabatic layer 46" and "adiabatic layer 56" are used in the Korean priority application of the present application in place of the terms "heat-resistant layer 46" and "heat-resistant layer 56" that are used in the present application. The Korean priority application is Korean Patent Application No. 2002-52898 filed on September 3, 2002, the disclosure of which is incorporated by reference in the present application in paragraph [0001] of the present application.

Submitted herewith is a Submission of English Translation of Priority Document submitting an English translation of Korean Patent Application No. 2002-52898 filed on September 3, 2002, and a Certification of Translation containing a statement that the English translation is accurate to perfect the applicants' claim for foreign priority under 35 USC 119(a)-(d). A certified copy of the Korean priority application was filed on September 2, 2003. The terms "adiabatic layer," "adiabatic layer 46," and "adiabatic layer 56" appear on page 2, line 24; page 6, lines 22 and 24; page 8, lines 6 and 16; page 9, lines 12, 13, and 19; page 10, lines 10 and 18; page 11, lines 5 and 25; page 13, lines 22 and 25; and page 14, lines 13 and 16, of the English translation.

It is submitted that it would have been understood by one of ordinary skill in the art at the time the invention was made that "adiabatic" means "occurring without gain or loss of heat," and comes from the Greek word "adiabatos," meaning "incapable of being crossed" or "impassable." Accordingly, it is submitted that it would have been understood by one of ordinary skill in the art at the time the invention was made that the term "adiabatic layer" in the Korean priority application of the present application refers to a layer that blocks transmission of heat, and thus has the same meaning as the term "heat-resistant layer" in claims 1 and 23 of the present

application as interpreted in light of the passages in paragraphs [0035] and [0039] of the specification of the present application referred to above.

In contrast, it is submitted that it would have been known to one of ordinary skill in the art at the time the invention was made that the pyrolytic boron nitride of which Chow's protective layers 25' and 25 are made has a very high thermal conductivity, such that protective layers 25' and 25 are layers that transmit heat, and thus cannot be a layer that blocks transmission of heat, i.e., "a heat-resistant layer" as recited in claims 1 and 23 of the present application or an "adiabatic layer" as disclosed in the Korean priority application of the present application.

Accordingly, for at least the foregoing reasons, it is submitted that the Chow's protective layers 25' and 25 are not a "heat-resistant layer" as recited in claims 1 and 23 as alleged by the Examiner.

Claims 1 and 24—"reflective layer" features

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in dependent claim 24.

As recognized by the Examiner, Chow does not disclose "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24. However, the Examiner considers these features to be disclosed by Chandler and Isaacson, and is of the opinion that it would have been obvious to incorporate these features of Chandler and Isaacson into Chow's device "to reflect the heat generated by the heater toward an intended heating direction."

Chandler

With respect to Chandler, the Examiner considers Fig. 5 of Chandler to show that "the heating element (72) is provided on a heating surface (76) with a heat reflecting layer (62) disposed between the heating element and a heat resistant/insulating layer (78)."

However, as described in column 7, lines 35-38, of Chandler, layer 78 is "a backing layer 78 of paper, paperboard, cloth, or other suitable material," rather than being "a heat resistant/insulating layer" as alleged by the Examiner or a "heat-resistant layer" as recited in claims 1 and 24. Nevertheless, the Examiner considers Chandler's backing layer 78 to be a "heat-resistant layer" as recited in claims 1 and 24, stating as follows on page 7 of the Final Office Action of October 12, 2006:

The disclose [sic] material of Chandler ["backing layer 78 of paper, paperboard, cloth, or other suitable material"] is capable of being a heat-resistant layer and there is no reason why this layer cannot be served [sic] as a heat-resistant layer. A layer that impedes a heat transfer maybe [sic] considered as a heat-resistant layer, and the applicant has not disclosed that such material would be contrary to the applicant's definition of the heat-resistant layer. There is no other showing in the applicant's claim how the heat-resistant layer is defined or shown to be distinguishable over the prior art. It is notoriously known to one of ordinary skill in the art as well as a lay person that a paper such as paper tower or cloth such as a kitchen towel is used to hold and remove a hot pan off a stove. This is notoriously practiced to show that a paper and cloth is used as a heat-resistant material to insulate or impede the heat transfer to the person holding such pan so the persons [sic] would not be burned. However, it is further noted that the claims are interpreted in light of the specification, and the applicant is invited to point out where in the specification the heat-resistance layer is defined or shown to be distinguishable over the prior art. No new matter is to be introduced.

With respect to the Examiner's statement that "[i]t is notoriously known to one of ordinary skill in the art as well as a lay person that a paper such as paper tower or cloth such as a kitchen towel is used to hold and remove a hot pan off a stove" (emphasis added), pursuant to MPEP 2141.03, the examiner must ascertain what would have been obvious to one of ordinary skill in the art at the time the invention was made, and not to the inventor, a judge, a layman, those skilled in remote arts, or to geniuses in the art at hand. *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 218 USPQ 865 (Fed. Cir. 1983), cert. denied, 464 U.S. 1043, 224 USPQ 520 (1984).

Furthermore, Chandler does not disclose that backing layer 78 is provided to serve as a "heat resistant layer" as recited in claims 1 and 24, and it is submitted that Chandler does not describe backing layer 78 in sufficient detail for one of ordinary skill in the art at the time the

invention was made to have recognized that backing layer 78 might arguably be capable of serving as a "heat-resistant layer" as recited in claims 1 and 24. Although Chandler discloses that backing layer 78 may be made of "paper, paperboard, cloth, or other suitable material," and the Examiner is of the opinion that a person desiring to remove a hot pan from a stove may use a paper towel or a kitchen towel as "a heat-resistant layer" by holding the hot pan with the paper towel or the kitchen towel, it is submitted that nothing whatsoever in Chandler indicates that the "paper, paperboard, cloth, or other suitable material" of which backing layer 78 may be made might have the same heat-resistant properties that the Examiner attributes to a paper towel. Furthermore, it appears that backing layer 78 is provided merely to provide a smooth surface for mounting Chandler's panel heating device on a wall substantially in the manner of wall paper as described in column 1, lines 17-21, of Chandler. As can be seen from FIG. 5 of Chandler, backing layer 78 is provided adjacent to corrugated reflective layer 62 which does not have a smooth surface. In contrast, the embodiments in FIGS. 3 and 8 of Chandler do not have a backing layer. The back layer in these embodiments is a reflective layer 38 or 80. Although the embodiment in FIG. 9 of Chandler has a backing layer 106, this backing layer 106 has a polished or shiny surface 108, and thus is equivalent to the reflective layers 38 and 80 in FIGS. 3 and 8. It is submitted that if backing layer 78 in FIG. 5 of Chandler were being provided to serve as a "heat-resistant layer" as alleged by the Examiner, then such a backing layer would also be provided in the embodiments disclosed in FIGS. 3, 8, and 9 of Chandler, which, as discussed above, is not the case in these embodiments.

Pursuant to MPEP 2141(II), when applying 35 USC 103, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention. *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). Pursuant to MPEP 2142, to reach a proper determination under 35 USC 103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. The tendency to resort to "hindsight" based upon applicant's disclosure is often

difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

Here, it is submitted that the only suggestion that Chandler's backing layer 78 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is contained in the applicants' disclosure, which the Examiner cannot rely on as a basis to reject the applicants' claims. That is, it is submitted that the only way that it might have occurred to one of ordinary skill in the art at the time the invention was made that Chandler's backing layer 78 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is by reading the applicants' disclosure. Accordingly, it is submitted that the Examiner' position that Chandler's backing layer 78 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is based solely on an impermissible hindsight reconstruction of the invention arrived at by reading the applicants' disclosure.

Accordingly, for at least the foregoing reasons, it is submitted that Chow and Chandler do not disclose or suggest "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24.

Isaacson

With respect to Isaacson, the Examiner considers Figs. 2 and 3 of Isaacson to show "a heating surface (14) upon which a heating element (50) provided thereto with a heat reflective layer (56) disposed between the heating element and a heat resistant layer (40)."

However as described in column 2, lines 46-48, of Isaacson, element 40 is "a holder 40 which may be in the form of a picture frame holder and constructed of plastic," rather than being "a heat resistant layer" as alleged by the Examiner or a "heat-resistant layer" as recited in claims 1 and 24. Nevertheless, the Examiner considers Isaacson's holder 40 to be a "heat-resistant layer" as recited in claims 1 and 24, stating as follows on page 7 of the Final Office Action of October 12, 2006:

Likewise, with respect to Isaacson, the applicant argues the layer 40 which is disclosed as a holder constructed of plastic,

is not the heat-resistant layer. But this argument is not deemed persuasive since there is no reason why this layer cannot be a heat-resistant layer as it provides the support and protection to the heater.

However, Isaacson does not disclose that holder 40 is provided to serve as a "heat resistant layer" as recited in claims 1 and 24, and it is submitted that Isaacson does not describe holder 40 in sufficient detail for one of ordinary skill in the art at the time the invention was made to have recognized that holder 40 might arguably be capable of serving as a "heat-resistant layer" as recited in claims 1 and 24. Furthermore, it is not seen what purpose might be served by making holder 40 serve as a "heat-resistant layer" as recited in claims 1 and 24 because holder 40 is exposed to the air, and thus does not contact anything which holder 40 might arguably protect from the heat generated by heater element 50 by serving as a "heat-resistant layer" as recited in claims 1 and 24, particularly since reflective layer 56 reflects the heat generated by heater element 50 away from holder 40 toward the surface of the aquarium tank 10 shown in FIG. 1 of Isaacson as described in column 3, lines 5-8, of Isaacson.

In any event, it is submitted that the only suggestion that Isaacson's holder 40 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is contained in the applicants' disclosure, which the Examiner cannot rely on as a basis to reject the applicants' claims. That is, it is submitted that the only way that it might have occurred to one of ordinary skill in the art at the time the invention was made that Isaacson's holder 40 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is by reading the applicants' disclosure. Accordingly, it is submitted that the Examiner's position that Isaacson's holder 40 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is based solely on an impermissible hindsight reconstruction of the invention arrived at by reading the applicants' disclosure pursuant to MPEP 2141(II) and 2142, *supra*.

Accordingly, for at least the foregoing reasons, it is submitted that Chow and Isaacson do not disclose or suggest "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24.

Claims 2 and 18

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature "wherein the entire cover heater is constituted by a single wire pattern formed over the entire top surface of the cover" recited in dependent claim 2, or the feature "wherein the entire body heater is constituted by a single wire pattern formed over at least the entire outer side wall of the main body" recited in dependent claim 18, because the entire cover heater and the entire body heater in all of the embodiments disclosed in Chow are each constituted by two heating element patterns, rather than being constituted by a single wire pattern as recited in claims 2 and 18. See inner heating element 22' and outer heating element 24' of a cover heater in Figs. 2 and 4 of Chow which show more detailed views of cover 11 in Fig. 1 of Chow, and inner heating element 22" and outer heating element 24" of a cover heater in cover 11' in Fig. 7 of Chow. See first layer heating element 22 and second layer heating element 24 of a body heater in Figs. 1-3 and 7 of Chow. Nevertheless, the Examiner considers Chow to disclose or suggest an entire cover heater constituted by a single wire pattern as recited in claim 2 and an entire body heater constituted by a single wire pattern as recited in claim 18, stating as follows on page 8 of the Final Office Action of October 12, 2006:

While Chow shows two wires, the claimed scope of" [sic] a single wire" is still met by Chow since single [sic] or one wire is included by [sic] two wires, each of the two wires being a single wire. Furthermore it is noted that Chow teaches that the heating element can be one or more (see column 2, lines 27-30). This clearly meets the claimed recitations.

However, the Examiner's statement that "the claimed scope of' a single wire' is still met by Chow since single or one wire is included by two wires, each of the two wires being a single wire" does not address the feature "wherein the entire cover heater is constituted by a single wire pattern" recited in claim 2, or the feature "wherein the entire body heater is constituted by a single wire pattern" recited in claim 18, and thus ignores the fact that Chow's entire cover heater is constituted by two wire patterns 22' and 24' or 22" and 24", and the fact that Chow's entire body heater is constituted by two wire patterns 22 and 24.

It appears that column 2, lines 27-30, of Chow referred to by the Examiner is actually column 2, lines 26-29, of Chow which reads as follows:

The deposition source may have a crucible having a cover thereon with one or more apertures therein and one or more heating elements on that cover about such an aperture.

However, the above passage of Chow relates only to Chow's cover heater, and thus does not disclose or suggest the feature "wherein the entire body heater is constituted by a single wire pattern" recited in claim 18.

Furthermore, although the above passage of Chow may arguably appear to allude to an embodiment in which a cover heater may have one heating element, it appears that this is the only place in Chow where such an embodiment is alluded to. The rest of the specification of Chow, the abstract of Chow, all of the claims of Chow, and all of the drawings of Chow disclose embodiments in which a cover heater has two heating elements. In light of this, it appears that the apparent allusion in column 2, lines 26-29, of Chow to an embodiment in which a cover heater has one heating element is an error, such that Chow does not actually disclose or suggest the feature "wherein the entire cover heater is constituted by a single wire pattern" recited in claim 2.

Alternatively, assuming *arguendo* that the apparent allusion in Chow to an embodiment in which a cover heater may have one heating element is not an error, pursuant to MPEP 2101.01, "[i]n determining that quantum of prior art disclosure which is necessary to declare an applicant's invention 'not novel' or 'anticipated' within section 102, the stated test is whether a reference contains an 'enabling disclosure'... ." *In re Hoeksema*, 399 F.2d 269, 158 USPQ 596 (CCPA 1968). The disclosure in an assertedly anticipating reference must provide an enabling disclosure of the desired subject matter; mere naming or description of the subject matter is insufficient, if it cannot be produced without undue experimentation. *Elan Pharm., Inc. v. Mayo Found. For Med. Educ. & Research*, 346 F.3d 1051, 1054, 68 USPQ2d 1373, 1376 (Fed. Cir. 2003).

Here, it is submitted that the mere reference to "one or more heating elements on that cover about such an aperture" in column 2, lines 26-29, of Chow does not provide an enabling disclosure for a cover having one heating element when considered in light of the fact that Chow specifically provides two heating elements in two layers to provide very good temperature uniformity as described, for example, in column 3, line 66, through column 4, line 5; column 4, lines 18-21; and column 7, lines 8-10, of Chow.

While MPEP 2101.01, *supra*, refers to 35 USC 102, rather than to 35 USC 103 under which claims 2 and 18 have been rejected, it is submitted that the rationale set forth therein is nevertheless applicable to the rejection of claims 2 and 18 under 35 USC 103 because the Examiner is not relying on the reference to one heating element in Chow to modify Chandler or Isaacson, but considers Chow to disclose the feature "wherein the entire cover heater is constituted by a single wire pattern formed over the entire top surface of the cover" recited in claim 2, and the feature "wherein the entire body heater is constituted by a single wire pattern formed over at least the entire outer side wall of the main body" recited in claim 18.

Accordingly, for at least the foregoing reasons, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature "wherein the entire cover heater is constituted by a single wire pattern formed over the entire top surface of the cover" recited in claim 2, or the feature "wherein the entire body heater is constituted by a single wire pattern formed over at least the entire outer side wall of the main body" recited in claim 18.

Claims 7 and 25

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature "wherein the insulating material forming the cover has a good heat radiation property" recited in dependent claim 7, or the feature "wherein the insulating material forming the main body has a good heat radiation property" recited in dependent claim 25.

Chow's cover 11 or 11' and main body 20 are formed of pyrolytic boron nitride which appears to be an electrical insulating material in light of column 3, lines 46-49, of Chow, which states that "[h]eating element 22 is encapsulated by an electrical insulating layer, 23, formed of pyrolytic boron nitride provided again by a well known chemical vapor deposition process." However, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest that pyrolytic boron nitride "has a good heat radiation property" as recited in claims 7 and 25. Nor has the Examiner shown that pyrolytic boron nitride "has a good heat radiation property" as recited in claims 7 and 25. Nevertheless, the Examiner considers Chow to disclose the "good heat radiation property" features of claims 7 and 25, stating as follows on page 8 of the Final Office Action of October 12, 2006:

With respect to claims 7 and 25, the applicant argues that the recited insulating materials having a good heat radiation property defines over the insulating material pyrolytic boron nitride as shown in Chow. The applicant argues that because the material in Chow does not show that such material "has a good heat radiation property, it fails to meet claims 7 and 25. The applicant's attention is directed to MPEP 2112.01. It states that when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are assumed to be inherent. In this case, the structure or the material recited is the "insulating material". It is also noted that there is no other recitation with respect to the composition of such insulating material. Given such a broad structure, the property relating to the heat radiation is presumed to be inherently met by Chow.

The Examiner's position appears to be that any insulating material "has a good heat radiation property" as recited in claims 7 and 25, and that since Chow's pyrolytic boron nitride is apparently an "insulating material" as recited in claims 7 and 25, Chow's pyrolytic boron nitride also "has a good heat radiation property" as recited in claims 7 and 25. However, it is submitted that the Examiner's apparent position is both incorrect and unreasonable because, as would have been understood by one of ordinary skill in the art at the time the invention was made, there are many different insulating materials having different heat radiation properties that are known in the art. In general, some of these different insulating materials have a poor heat radiation property, others have a moderate heat radiation property, and still others have a good heat radiation property. In the applicants' invention as recited in claims 7 and 25, the insulating material "has a good heat radiation property." In contrast, Chow does not disclose that pyrolytic boron nitride "has a good radiation property" as recited in claims 7 and 25, and in fact contains no discussion whatsoever relating to a heat radiation property of pyrolytic boron nitride or any other material. Nor has the Examiner shown that pyrolytic boron nitride "has a good heat radiation property" as recited in claims 7 and 25. Furthermore, the applicants do not merely disclose an insulating material that "has a good heat radiation property" as recited in claims 7 and 25. Rather, the applicants disclose a specific example of such an insulating material—alumina (Al_2O_3). See, for example, the last sentence of paragraph [0034] of the specification, which states that "[an] example of a material having a good heat radiation property is alumina (Al_2O_3)."

Furthermore, with respect to his theory of inherency, the Examiner has not provided a basis in fact and/or technical reasoning to reasonably support his apparent determination that it necessarily flows from the apparent teaching in column 3, lines 46-49, of Chow that pyrolytic boron nitride is an electrical insulating material that the pyrolytic boron nitride of which Chow's cover 11 or 11' and main body 20 are formed "has a good heat radiation property" as recited in claims 7 and 25 as required by MPEP 2112(IV), *supra*.

Accordingly, for at least the foregoing reasons, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature "wherein the insulating material forming the cover has a good heat radiation property" recited in claim 7, or the feature "wherein the insulating material forming the main body has a good heat radiation property" recited in claim 25.

Claim 9

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature "wherein the cover heater is formed in a concentric pattern around the nozzle" recited in dependent claim 9.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose the feature "wherein the cover heater is formed in a concentric pattern around the nozzle" recited in claim 9. However, the Examiner is of the opinion that it would have been obvious to modify Chow's cover heater to have this feature, stating as follows on page 3 of the Final Office Action of October 12, 2006:

With respect to claim 9, Chow shows the cover having a nozzle in the center of the cover with a cover heater provided around the nozzle. However, while, Chow does not show that the cover [sic] heater concentric [sic] pattern around the nozzle, it would have been obvious to one of ordinary skill in the art to provide the cover heater in the concentric pattern or any other pattern to effectively provide uniform and stable heating across the cover.

and as follows on pages 8 and 9 of the Final Office Action of October 12, 2006:

With respect to claim 9, the applicant argues that the examiner has not provided the motivation to modify the Chow's

cover heater to be "formed in a concentric pattern [sic] around the nozzle." This argument is not deemed persuasive. Chow discloses that it is important to provide a good uniform heat distribution to avoid hot and cold zones (see column 1, lines 60-68) and this would have been the motivation to provide the heating pattern in the concentric pattern. Chow shows a heating wire that encircles a hole or nozzle, and to one of ordinary skill in the art, it would have been obvious to modify the heating pattern in a concentric pattern or any other suitable pattern that would have provided a good uniform heating so that vaporization out of the nozzle is evenly heated. It is also noted that the applicant allows other forms of heating pattern [sic] other than a concentric pattern (paragraph 31). This is not the [sic] hindsight upon which the examiner has relied but rather this particular applicant's disclosure goes to the non-criticality of the heating pattern of a concentric pattern as opposed to other form [sic] of heating pattern as long as a uniform heating pattern can be maintained.

Column 1, lines 60-68, of Chow referred to by the Examiner reads as follows:

In addition, the heater temperature as a result is going to be substantially higher than that to which the crucible is desired to be raised, a situation which causes added outgassing from the heater element and reduces its lifetime. The non-uniform spatial distribution of the heating elements means that the crucible will have resulting hot and cold zones making achieving of temperature uniformity difficult.

Although this passage may arguably be considered to suggest that a uniform spatial distribution of the heating elements may avoid hot and cold zones, this passage does not mention a concentric pattern, and accordingly it is submitted that nothing whatsoever in this passage would have motivated one of ordinary skill in the art at the time the invention was made to form Chow's cover heater "in a concentric pattern around the nozzle" as recited in claim 9.

Pursuant to MPEP 2143, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the

prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir 1991).

Here, it is submitted that the only suggestion to modify Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9 is contained in the applicants' disclosure, which the Examiner is prohibited from relying on as a source for the motivation required to support a rejection under 35 USC 103.

With respect to the Examiner's statement that "[i]t is also noted that the applicant allows other forms of heating pattern [sic] other than a concentric pattern (paragraph 31)," the Examiner is apparently referring to the following portion of paragraph [0031] of the applicants' specification:

The cover heater 43 may have a concentric pattern around the nozzle 42, as shown in FIG. 4C. However, any other patterns which can be laid over the entire top surface of the cover 40 can be applied.

The Examiner has apparently relied on these statements by the applicants to hold that a cover heater "formed in a concentric pattern around the nozzle" as recited in claim 9 is equivalent to a cover heater formed in any other pattern, such as the patterns in which Chow's cover heater is formed, and accordingly, the Examiner is of the opinion that it would have been obvious to modify Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9.

Pursuant to MPEP 2144.06, in order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. *In re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958).

Here, the Examiner has not identified anything whatsoever in Chow, Chandler, and Isaacson or elsewhere in the prior art that recognizes the equivalency relied on by the Examiner to support the obviousness rejection of claim 9. Rather, the Examiner has impermissibly relied on paragraph [0031] of the applicants' specification as a source for the equivalency in contravention of MPEP 2144.06, *supra*.

Accordingly, for at least the foregoing reasons, it is submitted that the Examiner has not identified any motivation whatsoever in Chow, Chandler, and Isaacson or elsewhere in the prior

art to modify Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9, such that the Examiner has not established a *prima facie* case of obviousness with respect to claim 9 pursuant to MPEP 2143, *supra*.

Claim 16

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is constituted by a sprayed heating block on the cover" and "wherein the sprayed heating block is constituted by a sprayed heat emitting material on the cover" recited in dependent claim 16.

In explaining the rejection of claim 16, the Examiner states as follows on page 3 of the Final Office Action of October 12, 2006:

With respect to the method by which the heating element or block is provided on the cover and how such is formed, it is noted that the pending claims are apparatus or product and such is defined by the product itself and not by the process it [sic] is produced.

and as follows on page 9 of the Final Office Action of October 12, 2006:

With respect to claim 16, it is further noted that such claim is a product by process claim wherein the patentability is defined by the product itself and not by the process. All the structure of claim 16 is shown, and the applicant's argument is not deemed [sic] persuasive.

These arguments by the Examiner with respect to claim 16 are substantially the same as the Examiner's arguments with respect to claim 16 on page 8 of the Final Office Action of November 17, 2005, and page 8 of the Office Action of May 2, 2006. However, claim 16 was amended in the Amendment of July 27, 2006, so that claim 16 is no longer a product-by-process claim. On page 17 of the Amendment of July 27, 2006, the applicants stated that "claim 16 has now been amended so that it is no longer a product-by-process claim, such that the Examiner's comments are no longer applicable to claim 16." However, the Examiner did not take note of this argument and answer the substance of it in the Final Office Action of October 12, 2006, as required by MPEP 707.07(f).

Chow's cover heater is constituted by the inner heating element 22' or 22", the insulating layer 23' or 23", and the outer heating element 24' or 24," and is apparently formed the same way that Chow's body heater is formed. Chow's body heater is formed by depositing pyrolytic graphite on the shell 20 by chemical vapor deposition, selectively masking the resulting graphite surface, and etching away the unmasked portions to form the first layer heating element 22; depositing pyrolytic boron nitride on the first layer heating element 22 to form the insulating layer 23; and depositing pyrolytic graphite on the shell insulating layer 23 by chemical vapor deposition, selectively masking the resulting graphite surface, and etching away the unmasked portions to form the second layer heating element 22. See column 3, line 24, through column 4, line 5, of Chow which describes the process of forming Chow's body heater. Thus, Chow's cover heater constituted by the inner heating element 22' or 22", the insulating layer 23' or 23", and the outer heating element 24' or 24" is an etched heating element pattern, wherein the etched heating element pattern is constituted by a chemical vapor deposited heat emitting material, and thus is not "constituted by a sprayed heating block on the cover" as recited in claim 16, "wherein the sprayed heating block is constituted by a sprayed heat emitting material on the cover" as recited in claim 16. In any event, it is submitted that Chow's heating element pattern is clearly not a "heating block" as recited in claim 16 because, as would have been understood by one of ordinary skill in the art at the time the invention was made, a "heating block" does not have a pattern.

Accordingly, for at least the foregoing reasons, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is constituted by a sprayed heating block on the cover" and "wherein the sprayed heating block is constituted by a sprayed heat emitting material on the cover" recited in claim 16.

Claims 29 and 30

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is a single-layer cover heater" and "wherein the body heater is a single-layer body heater" recited in dependent claim 29, or the features "wherein the single-layer cover heater is the only cover heater on the cover" and "wherein the single-layer body heater is the only body heater on the main body" recited in dependent claim 30, because

Chow's cover heater is a three-layer cover heater constituted by the inner heating element 22' or 22", the insulating layer 23' or 23", and the outer heating element 24' or 24", and Chow's body heater is a three-layer body heater constituted by the first layer heating element 22, the insulating layer 23, and the second layer heating element 24.

In explaining the rejection of claims 29 and 30, the Examiner states as follows on page 10 of the Final Office Action of October 12, 2006:

With respect to the recited single-layer cover or body heater, the applicant shows different layers of Chow including the first and second element with an insulating layer to show that Chow cover is a three layer heater. Applying the same analysis, the applicant's cover heater would be a two layer heater having a heating element and an insulating layer rather than a single layer heater as recited, but nevertheless since the claim 30 seems to indicate the single layer relates to having a single or one cover heater, i.e., the heating element, and since Chow teaches only one heating element can be used, as shown in column 2, lines 27-30, the recited single layer cover heater and the single layer body heater are met by Chow.

However, it is submitted that the applicants' cover heater would not be "a two layer heater having a heating element and an insulating layer rather than a single layer heater as recited [in claims 29 and 30]" under the Examiner's analysis applied to Chow's cover heater as set forth above because the applicants do not disclose any insulating layer corresponding to Chow's insulating layer 23' or 23" disposed between Chow's inner heating element 22' or 22" and Chow's outer heating element 24' or 24". The purpose of Chow's insulating layer 23' or 23" is to prevent a short circuit between Chow's inner heating element 22' or 22" and Chow's outer heating element 24' or 24". However, since the applicants disclose a single-layer cover heater 43 and a single-layer body heater 53, the single-layer cover heater 43 and the single-layer body heater 53 do not include any insulating layer corresponding to Chow's insulating layer 23' or 23".

Also, as discussed above in connection with claims 2 and 18, the passage in column 2, lines 27-30, of Chow referred to by the Examiner (which appears to actually be column 2, lines 26-29, of Chow) relates only to Chow's cover heater, and thus does not disclose or suggest the feature "wherein the body heater is a single-layer body heater" recited in claim 29, or the feature "wherein the single-layer body heater is the only body heater on the main body" recited in claim 30.

Furthermore, with respect to the Examiner's statement that "since Chow teaches only one heating element can be used, as shown in column 2, lines 27-30, the recited single layer cover heater and the single layer body heater are met by Chow," it is submitted that the mere reference to "one or more heating elements on that cover about such an aperture" in column 2, lines 26-29, of Chow does not provide an enabling disclosure for a cover having one heating element for the reasons discussed above in connection with the feature "wherein the entire cover heater is constituted by a single wire pattern formed over the entire top surface of the cover" recited in claim 2.

Accordingly for at least the foregoing reasons, It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is a single-layer cover heater" and "wherein the body heater is a single-layer body heater" recited in claim 29, or the features "wherein the single-layer cover heater is the only cover heater on the cover" and "wherein the single-layer body heater is the only body heater on the main body" recited in claim 30.

Claim 31

Pursuant to MPEP 2143.04, if an independent claim is nonobvious under 35 USC 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Accordingly, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature "wherein the heat-resistant layer blocks heat generated by the cover heater from being transferred outside the heating crucible" recited in dependent claim 31 at least because Chow, Chandler, and Isaacson do not disclose or suggest "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1 from which claim 31 depends for the reasons discussed above in connection with claim 1.

Furthermore, the Examiner did not specifically discuss claim 31 in the Final Office Action of October 12, 2006, or otherwise address the feature "wherein the heat-resistant layer blocks heat generated by the cover heater from being transferred outside the heating crucible" recited in claim 31, such the Examiner has not established a *prima facie* case of obviousness with respect to claim 31 pursuant to MPEP 2143, *supra*.

Claims 4, 11-13, 17, 21, and 22

It is submitted that dependent claims 4, 11-13, 17, 21, and 22 which depend directly or indirectly from claim 1 are patentable over Chow, Chandler, and Isaacson for at least the same reasons discussed above that claim 1 is patentable over Chow, Chandler, and Isaacson pursuant to MPEP 2143.04, *supra* (citing *In re Fine*).

Conclusion—Rejection 1

For at least the foregoing reasons, it is respectfully requested that the rejection of claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson be reversed.

Rejection 2—Claims 3, 14, and 19

Claims 3, 14, and 19 stand rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Kano et al. (Kano) (U.S. Patent No. 6,242,719).

However, it is submitted that dependent claims 3, 14, and 19, which depend directly or indirectly from various ones of claims 1, 2, and 18, are patentable over Chow, Chandler, Isaacson, and Kano for at least the same reasons discussed above that claims 1, 2, and 18 are patentable over Chow, Chandler, and Isaacson pursuant to MPEP 2143.04, *supra* (citing *In re Fine*).

For at least the foregoing reasons, it is respectfully requested that the rejection of claims 3, 14, and 19 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view, of Kano be reversed.

Rejection 3—Claims 8, 15, and 26

Claims 8, 15, and 26 stand rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Bichrt (U.S. Patent No. 6,162,300).

However, it is submitted that dependent claims 8, 15, and 26, which depend directly or indirectly from various ones of claims 1, 7, and 25, are patentable over Chow, Chandler, Isaacson, and Bichrt for at least the same reasons discussed above that claims 1, 7, and 25 are patentable over Chow, Chandler, and Isaacson pursuant to MPEP 2143.04, *supra* (citing *In re Fine*).

For at least the foregoing reasons, it is respectfully requested that the rejection of claims 8, 15, and 26 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Bichrt, be reversed.

Rejection 4—Claim 10

Claim 10 stands rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Okuda et al. (Okuda) (U.S. Patent No. 4,804,823).

However, it is submitted that Chow, Chandler, Isaacson, and Okuda do not disclose or suggest the features "wherein the cover heater is constituted by a sintered printed conductive paste on the cover" and "wherein the conductive paste comprises metal particles and metal oxide" recited in dependent claim 10.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is constituted by a sintered printed conductive paste on the cover" and "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10. However, the Examiner considers these features of claim 10 to be disclosed by Okuda, and is of the opinion that it would have been obvious to incorporate these features into Chow's device "to adapt Chow, as modified by Chandler or Isaacson, with the cover heater made of conductive paste having the metal particles and metal oxides to form a

heating element that can provide a mechanically and thermally stable heater that can also withstand a high temperature."

Although the Examiner did not identify any particular portion of Okuda as support for the rejection, the most relevant passages of Okuda appear to be column 5, lines 26-30, of Okuda which reads as follows:

The heat-generating generator layer containing TiN is formed of a sintered body of (a) titanium nitride, (b) silicon nitride and (c) a sintering aid. As the sintering aid (c), there are used yttria, magnesia and alumina. An especially preferred example of the ceramic composition comprises 40 to 85% by weight of titanium nitride, 20 to 54% by weight of silicon nitride and 1 to 10% by weight of the sintering aid.

and column 6, line 54, through column 7, line 4, of Okuda which reads as follows:

In accordance with still another embodiment of the present invention, the ceramic substrate is composed of a sintered body of silicon nitride and the heat-generating resistor is composed of a tungsten carbide layer. The heat-generating resistor layer of WC is prepared, for example, by sintering a paste containing WC alone.

In the examples of the present invention, the heat-generating resistor paste comprising substantially pure WC, that is, WC having a purity of 99.8%, was used. However, in order to adjust the resistance value of the heat-generating resistor, improve the denseness of the resistor or enhance the bondability to the silicon nitride substrate, up to about 40% by weight of a single substrate, oxide, nitride, carbide or carbonitride of an element of the group IIIA such as Y or an element of the group IIa such as Mg, or the same Si₃N₄ as that of the silicon nitride substrate, may be added to WC. If such an additive is incorporated, the effects of the present invention are not degraded.

Tables 1, 3, 4, and 8 in Okuda disclose various examples of the conductive pastes described in the above portions of Okuda.

However, it is submitted that Okuda does not disclose or suggest the feature "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10 because all of the conductive pastes described in the above portions of Okuda and shown in Tables 1, 3, 4, and 8 of Okuda comprise metal nitride particles (TiN) and metal oxide (yttria, magnesia,

alumina) or metal carbide particles (WC) and metal oxide (yttria, magnesia, alumina), rather than "metal particles and metal oxide" as recited in claim 10. It is submitted that metal nitride particles (TiN) and metal carbide particles (WC) are not "metal particles" as recited in claim 10. Rather, it is submitted that examples of "metal particles" as recited in claim 10 in the context of Okuda would be particles of Ti or W.

Although Tables 2 and 8 of Okuda disclose conductive pastes that comprise "metal particles" (Mo or W) as recited in claim 10, these conductive pastes do not also comprise "metal oxide" as recited in claim 10 as can be seen, for example, from column 8, lines 49-51; column 9, lines 67-68; column 13, lines 1-6; and column 15, lines 59-60, of Okuda. Thus, Tables 2 and 8 of Okuda do not disclose or suggest the feature "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10.

As can be seen from the preceding discussion, Okuda discloses (1) examples in which a conductive paste comprises the combination of metal nitride particles (TiN) and metal oxide; (2) examples in which a conductive paste comprises the combination of metal carbide particles (WC) and metal oxide; and (3) examples in which a conductive paste comprises only metal particles (either Mo or W). However, Okuda does not disclose a conductive paste that comprises the combination of "metal particles and metal oxides" recited in claim 10.

The Examiner nevertheless considers Okuda to disclose the feature "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10, stating as follows on page 9 of the Final Office Action of October 12, 2006:

With respect to Okuda, the applicant argues that the metal nitride or carbide particles of Okuda do not meet the recited "metal particles". The recited metal particles are particles that are made of metals. The particles of Okuda are made of metals as well. This clearly meets the recited "metal particles". The applicant is invited to show if there is other definition or teaching in the applicant's disclosure that would be distinguishable over the prior art wherein the particles made of metal in Okuda are not the claimed "metal particles". No new matter is to be introduced in the specification.

However, it appears from these comments that the Examiner does not understand the difference between the metal nitride particles (TiN) and metal carbide particles (WC) disclosed in Okuda, and the "metal particles" recited in claim 10. Okuda's metal nitride particles (TiN) and

metal carbide particles (WC) are not "made of metals" as alleged by the Examiner. Rather, Okuda's metal nitride particles (TiN) are made of the metal Ti and the nonmetal N, and Okuda's metal carbide particles (WC) are made of the metal W and the nonmetal C. Thus, each particle of Okuda's metal nitride particles (TiN) is a particle of TiN, and each particle of Okuda's metal carbide particles (WC) is a particle of WC. Accordingly, it is submitted that Okuda does not disclose a conductive paste that comprises the combination of "metal particles and metal oxides" recited in claim 10.

Furthermore, during the personal interview conducted on December 28, 2006, the Examiner said that he is interpreting the term "metal particles" in claim 10 to mean "particles comprising metal." However, pursuant to MPEP 2111, *supra*, it is submitted that such an interpretation of the term "metal particles" is unreasonable because it vastly expands the scope of the term to the point that the interpretation becomes inconsistent with the specification. Furthermore, it is submitted that such an interpretation of "metal particles" is also inconsistent with the interpretation that those skilled in the art would reach.

Accordingly, for at least the foregoing reasons, it is submitted that Chow, Chandler, Isaacson, and Okuda do not disclose or suggest the features "wherein the cover heater is constituted by a sintered printed conductive paste on the cover" and "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10, and it is respectfully requested that the rejection of claim 10 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Okuda, be reversed.

Rejection 5—Claim 20

Claim 20 stands rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Takagi (U.S. Patent No. 4,217,855).

However, it is submitted that dependent claim 20, which depends directly from claim 18 and indirectly from claim 1, is patentable over Chow, Chandler, Isaacson, and Takagi for at least

the same reasons discussed above that claims 1 and 18 are patentable over Chow, Chandler, and Isaacson pursuant to MPEP 2143.04, *supra* (citing *In re Fine*).

For at least the foregoing reasons, it is respectfully requested that the rejection of claim 20 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Takagi, be reversed.

Rejection 6—Claims 27 and 28

Claims 27 and 28 stand rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Chen et al. (Chen) (U.S. Patent No. 6,024,799) or Murakami et al. (Murakami) (U.S. Patent No. 5,728,223).

However, it is submitted that dependent claims 27 and 28 are patentable over Chow, Chandler, Isaacson, Chen, and Murakami for at least the following reasons.

Claim 27

It is submitted that Chow, Chandler, Isaacson, Chen, and Murakami do not disclose or suggest the feature "wherein the nozzle is a convergent-divergent nozzle through which the gaseous organic substance comes out from the main body in a diverging pattern, thereby enabling the heating crucible to produce a diverging pattern of the gaseous organic substance" recited in dependent claim 27.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose "a convergent-divergent nozzle" as recited in claim 27. However, the Examiner considers Chen and Murakami to "show that it is well known in the art to provide the gaseous outlet nozzle with a convergent-divergent nozzle that is flush with the gas outlet surface cover," and is of the opinion that it would have been obvious to modify the combination of Chow and Chandler or Isaacson to use the convergent-divergent nozzle of Chen or Murakami "to provide a more defined outlet gas flow for even distribution of the vapor deposition."

However, the Examiner has not identified where Chen and Murakami disclose that the convergent-divergent nozzle is "a convergent-divergent nozzle through which the gaseous organic substance comes out from the main body in a diverging pattern, thereby enabling the heating crucible to produce a diverging pattern of the gaseous organic substance" as recited in claim 27. On page 27 of the Request for Reconsideration After Final Rejection of December 11, 2006, the applicants pointed this out and requested that the Examiner point out where Chen and Murakami disclose that the convergent-divergent nozzle produces "a diverging pattern" as recited in claim 27 in the next Office Action, even if that Office Action is an Advisory Action. However, the Examiner did not respond to this request in the Advisory Action of January 4, 2007.

Furthermore, assuming *arguendo* that Chen and Murakami disclose a convergent-divergent nozzle that produces "a diverging pattern" as recited in claim 27, it is submitted that it would not have been obvious to use this convergent-divergent nozzle in the combination of Chow and Chandler or Isaacson as proposed by the Examiner because Figs. 5 and 6 and column 6, lines 36-50, of Chow disclose that Chow's crucible 10 produces a converging material beam, and column 6, line 66, through column 7, line 5, of Chow discloses that the single aperture 19' in Fig. 7 "can also provide material beam directivity," apparently meaning a converging material beam in light of FIGS. 5 and 6 and column 6, lines 36-50, of Chow referred to above and in light of column 2, lines 14-16, of Chow which states that "[t]here is desire for a source which can provide a material beam displaying good directivity." It is submitted that one of ordinary skill in the art at the time the invention was made would have understood the phrases "material beam directivity" and "a material beam displaying a good directivity" to mean a converging material beam in light of FIGS. 5 and 6 and column 6, lines 36-50, of Chow referred to above.

Pursuant to MPEP 2143.01(V), if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Here, as discussed above, one of the intended purposes of Chow's crucible 10 is to produce a converging material beam. Assuming *arguendo* that Chen and Murakami disclose a convergent-divergent nozzle that produces "a diverging pattern" as recited in claim 27, it is

submitted that using this convergent-divergent nozzle in Chow as proposed by the Examiner would produce a diverging material beam, thereby rendering Chow's crucible 10 unsuitable for its intended purpose of producing a converging material beam. Accordingly, it is submitted that there is no suggestion or motivation to modify Chow's crucible 10 to use Chen and Murakami's convergent-divergent nozzle pursuant to MPEP 2143.01(V), *supra*, such that the Examiner has not established a *prima facie* case of obviousness with respect to claim 27 pursuant to MPEP 2143, *supra*.

In response to similar arguments presented in the Amendment of July 27, 2006, the Examiner states as follows on pages 9 and 10 of the Final Office action of October 12, 2006:

With respect to the recited "convergent-divergent nozzle", the applicant argues Chow shows a converging material beam because Chow shows its beam to having a "good directivity". Having a good directivity does not necessarily mean "converging" beam as argued by the applicant. In fact, the nozzle 19' in Figure 7 of Chow shows a nozzle with widening open end as the beam is let out. This creates more of a divergent pattern than a converging pattern. This clearly shows why the good directivity does not necessarily mean a converging outlet.

However, the Examiner has apparently ignored the fact that Figs. 5-6 and column 6, lines 36-50, of Chow clearly disclose that Chow's crucible 10 produces a converging material beam. Furthermore, assuming *arguendo* that nozzle 19' in FIG. 7 of Chow produces "more of a divergent pattern than a converging pattern" as alleged by the Examiner, and that Chen and Murakami disclose a convergent-divergent nozzle that produces "a diverging pattern" as recited in claim 27, it is submitted that there would have been no motivation for one of ordinary skill in the art at the time the invention was made to replace Chow's nozzle 19' with the convergent-divergent nozzle disclosed by Chen and Murakami as proposed by the Examiner because Chow's nozzle 19' already produces "more of a divergent pattern than a converging pattern" as alleged by the Examiner.

Accordingly, for at least the foregoing reasons, it is submitted that Chow, Chandler, Isaacson, Chen, and Murakami do not disclose or suggest the feature "wherein the nozzle is a convergent-divergent nozzle through which the gaseous organic substance comes out from the main body in a diverging pattern, thereby enabling the heating crucible to produce a diverging pattern of the gaseous organic substance" recited in claim 27.

Claim 28

It is submitted that Chow, Chandler, Isaacson, Chen, and Murakami do not disclose or suggest the features "wherein the nozzle extends from a surface of the cover facing toward the main body to a surface of the heat-resistant layer facing away from the main body; wherein an entry opening of the nozzle through which the gaseous organic substance enters the nozzle is flush with the surface of the cover facing toward the main body; wherein an exit opening of the nozzle through which the gaseous organic substance exits from the nozzle is flush with the surface of the heat-resistant layer facing away from the main body; and wherein the nozzle converges from the entry opening to a throat of the nozzle at a junction between the cover and the heat-resistant layer, and diverges from the throat of the nozzle to the exit opening" recited in dependent claim 28.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose the features "wherein the nozzle converges from the entry opening to a throat of the nozzle . . . , and diverges from the throat of the nozzle to the exit opening" recited in claim 28, which the Examiner apparently considers to be a recitation of a convergent-divergent nozzle. However, the Examiner considers Chen and Murakami to "show that it is well known in the art to provide the gaseous outlet nozzle with a convergent-divergent nozzle that is flush with the gas outlet surface cover," and is of the opinion that it would be have been obvious to modify the combination of Chow and Chandler or Isaacson to use the convergent-divergent nozzle of Chen or Murakami "to provide a more defined outlet gas flow for even distribution of the vapor deposition."

However, all of the convergent-divergent nozzles disclosed in Chen and Murakami are formed in a solid block of material that has no layers, such that Chen and Murakami do not disclose or suggest at least the feature "wherein the nozzle converges from the entry opening to a throat of the nozzle at a junction between the cover and the heat-resistant layer, and diverges from the throat of the nozzle to the exit opening" recited in claim 28. The applicants also pointed this out in the paragraph bridging pages 25 and 26 of the Amendment of July 27, 2006, but the Examiner did not respond to these arguments or otherwise address this feature of claim

28 in the Final Office Action of October 12, 2006, such that the Examiner has not established a *prima facie* case of obviousness with respect to claim 28 pursuant to MPEP 2143, *supra*.

Furthermore, during the personal interview conducted on December 28, 2006, the Examiner said that he had not fully understood what is recited in claim 28, and that claim 28 was allowable over Chow, Chandler, Isaacson, Chen, and Murakami. See the Interview Summary for the personal interview in which the Examiner states that "[c]laim 28, however, upon reconsideration was deemed to be distinguishable over the Chow reference."

Accordingly, for at least the foregoing reasons, it is submitted that Chow, Chandler, Isaacson, Chen, and Murakami do not disclose or suggest the features "wherein the nozzle extends from a surface of the cover facing toward the main body to a surface of the heat-resistant layer facing away from the main body; wherein an entry opening of the nozzle through which the gaseous organic substance enters the nozzle is flush with the surface of the cover facing toward the main body; wherein an exit opening of the nozzle through which the gaseous organic substance exits from the nozzle is flush with the surface of the heat-resistant layer facing away from the main body; and wherein the nozzle converges from the entry opening to a throat of the nozzle at a junction between the cover and the heat-resistant layer, and diverges from the throat of the nozzle to the exit opening" recited in dependent claim 28.

Conclusion—Rejection 6

For at least the foregoing reasons, it is respectfully requested that the rejection of claims 27 and 28 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Chen or Murakami, be reversed.

Conclusion—Argument

In view of the law and the facts stated herein, it is submitted that the various combinations of Chow, Chandler, Isaacson, Kano, Bichrt, Okuda, Takagi, Chen, and Murakami

relied on by the Examiner do not disclose or suggest all of the features recited in claims 1-4 and 7-31.

Accordingly, it is respectfully requested that the rejections of claims 1-4 and 7-31 under 35 USC 103(a) as being unpatentable over the various combinations of Chow, Chandler, Isaacson, Kano, Bichrt, Okuda, Takagi, Chen, and Murakami relied on by the Examiner be reversed.

If there are any additional fees associated with the filing of this paper, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

STEIN, MCEWEN & BUI, LLP

Date: 04/19/07

By: Randall S. Svihi

Randall S. Svihi
Registration No. 56,273

1400 Eye St., N.W.
Suite 300
Washington, D.C. 20005
Telephone: (202) 216-9505
Facsimile: (202) 216-9510

VIII. CLAIMS APPENDIX

1. (Previously presented) A heating crucible for an organic thin film forming apparatus, the heating crucible comprising:

a main body in which to contain an organic substance;

a cover provided on the main body, the cover formed of an insulating material and having a nozzle through which a gaseous organic substance comes out from the main body;

a cover heater formed as a thin film type on the top surface of the cover;

a heat-resistant layer formed on a surface of the cover heater;

a reflective layer between the cover heater and the heat-resistant layer; and

a body heater heating the main body.

2. (Previously presented) The heating crucible of claim 1, wherein the entire cover heater is constituted by a single wire pattern formed over the entire top surface of the cover, the single wire pattern of the entire cover heater having a positive terminal at a first end of the single wire pattern and a negative terminal at a second end of the single wire pattern.

3. (Previously presented) The heating crucible of claim 2, wherein the single wire pattern of the cover heater is constituted by printed platinum on the cover.

4. (Original) The heating crucible of claim 1, wherein the cover further comprises at least one embedded thermocouple.

5.-6. (Canceled)

7. (Original) The heating crucible of claim 1, wherein the insulating material forming the cover has a good heat radiation property.

8. (Original) The heating crucible of claim 7, wherein the cover is formed of alumina.

9. (Original) The heating crucible of claim 1, wherein the cover heater is formed in a concentric pattern around the nozzle.

10. (Previously presented) The heating crucible of claim 1, wherein the cover heater is constituted by a sintered printed conductive paste on the cover; and
wherein the conductive paste comprises metal particles and metal oxide.

11. (Previously presented) The heating crucible of claim 1, wherein the cover heater is constituted by a thin chemical vapor deposition graphite layer on the cover.

12. (Previously presented) The heating crucible of claim 1, wherein the insulating material forming the cover comprises a thermally conductive ceramic material.

13. (Previously presented) The heating crucible of claim 12, wherein the thermally conductive ceramic material comprises a ceramic nitride or a ceramic carbide.

14. (Original) The heating crucible of claim 13, wherein the ceramic nitride is aluminum nitride.

15. (Original) The heating crucible of claim 13, wherein the ceramic carbide is silicon carbide.

16. (Previously presented) The heating crucible of claim 1, wherein the cover heater is constituted by a sprayed heating block on the cover; and
wherein the sprayed heating block is constituted by a sprayed heat emitting material on the cover.

17. (Previously presented) The heating crucible of claim 1, wherein the main body is formed of the same insulating material forming the cover; and
wherein the body heater is formed as a thin film type on the outer wall of the main body.

18. (Previously presented) The heating crucible of claim 17, wherein the entire body heater is constituted by a single wire pattern formed over at least the entire outer side wall of the main body, the single wire pattern of the entire body heater having a positive terminal at a first end of the single wire pattern and a negative terminal at a second end of the single wire pattern.

19. (Previously presented) The heating crucible of claim 18, wherein the single wire pattern of the body heater is constituted by printed platinum on the body.

20. (Previously presented) The heating crucible of claim 18, wherein the single wire pattern of the body heater is further formed on the entire outer bottom wall of the main body.

21. (Original) The heating crucible of claim 17, wherein the insulating material forming the main body is a ceramic material.

22. (Original) The heating crucible of claim 17, wherein the main body further comprises at least one embedded thermocouple.

23. (Original) The heating crucible of claim 17, further comprising a heat-resistant layer on the surface of the body heater.

24. (Original) The heating crucible of claim 23, further comprising a reflective layer between the body heater and the heat-resistant layer.

25. (Original) The heating crucible of claim 17, wherein the insulating material forming the main body has a good heat radiation property.

26. (Original) The heating crucible of claim 25, wherein the main body is formed of alumina.

27. (Previously presented) The heating crucible of claim 1, wherein the nozzle is a convergent-divergent nozzle through which the gaseous organic substance comes out from the main body in a diverging pattern, thereby enabling the heating crucible to produce a diverging pattern of the gaseous organic substance.

28. (Previously presented) The heating crucible of claim 1, wherein the nozzle extends from a surface of the cover facing toward the main body to a surface of the heat-resistant layer facing away from the main body;

wherein an entry opening of the nozzle through which the gaseous organic substance enters the nozzle is flush with the surface of the cover facing toward the main body;

wherein an exit opening of the nozzle through which the gaseous organic substance exits from the nozzle is flush with the surface of the heat-resistant layer facing away from the main body; and

wherein the nozzle converges from the entry opening to a throat of the nozzle at a junction between the cover and the heat-resistant layer, and diverges from the throat of the nozzle to the exit opening.

29. (Previously presented) The heating crucible of claim 1, wherein the cover heater is a single-layer cover heater; and

wherein the body heater is a single-layer body heater.

30. (Previously presented) The heating crucible of claim 29, wherein the single-layer cover heater is the only cover heater on the cover; and

wherein the single-layer body heater is the only body heater on the main body.

31. (Previously presented) The heating crucible of claim 1, wherein the heat-resistant layer blocks heat generated by the cover heater from being transferred outside the heating crucible.

IX. EVIDENCE APPENDIX

1. Chandler (U.S. Patent No. 2,799,764) cited by the Examiner in the Office Action of June 22, 2005.
2. Isaacson et al. (U.S. Patent No. 3,842,241) cited by the Examiner in the Office Action of June 22, 2005.
3. Okuda et al. (U.S. Patent No. 4,804,823) cited by the Examiner in the Office Action of September 8, 2004.
4. Takagi (U.S. Patent No. 4,217,855) cited by the Examiner in the Final Office Action of October 12, 2006.
5. Chow (U.S. Patent No. 5,157,240) cited by the Examiner in the Office Action of September 8, 2004.
6. Murakami et al. (U.S. Patent No. 5,728,223) cited by the Examiner in the Office Action of May 2, 2006.
7. Chen et al. (U.S. Patent No. 6,024,799) cited by the Examiner in the Office Action of May 2, 2006.
8. Bichrt (U.S. Patent No. 6,162,300) cited by the Examiner in the Office Action of September 8, 2004.
9. Kano et al. (U.S. Patent No. 6,242,719) cited by the Examiner in the Office Action of September 8, 2004.
10. Interview Summary for the personal interview between Primary Examiner Sang Yeop Paik and the applicant's attorney Randall S. Svhila conducted on December 28, 2006.
11. English translation of Korean Patent Application No. 2002-52898 filed on September 3, 2002, the Korean priority application of the present application, submitted on April 19, 2007.

X. RELATED PROCEEDINGS APPENDIX

None.